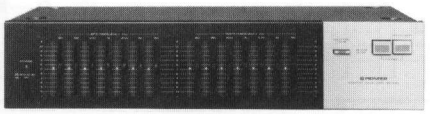
PIONEER®

Service Manual

CIRCUIT DESCRIPTIONS
REPAIR & ADJUSTMENTS



ORDER NO.
ARP-125-0

GRAPHIC EQUALIZER

SG-530

MODEL SG-530 COMES IN SIX VERSIONS DISTINGUISHED AS FOLLOWS:

Type	Voltage	Remarks
KU	120V only	U.S.A. model
R	110V – 120V and 220V – 240V (Switchable)	General export model
R/G	110V – 120V and 220V – 240V (Switchable)	U.S. Military model
WE	220V – 240V	Europe model
WB	220V – 240V	United Kingdom model
WP	220V – 240V	Australia model

This service manual is applicable to the KU type. When repairing the R, R/G, WE, WB and WP types, please see page 15.

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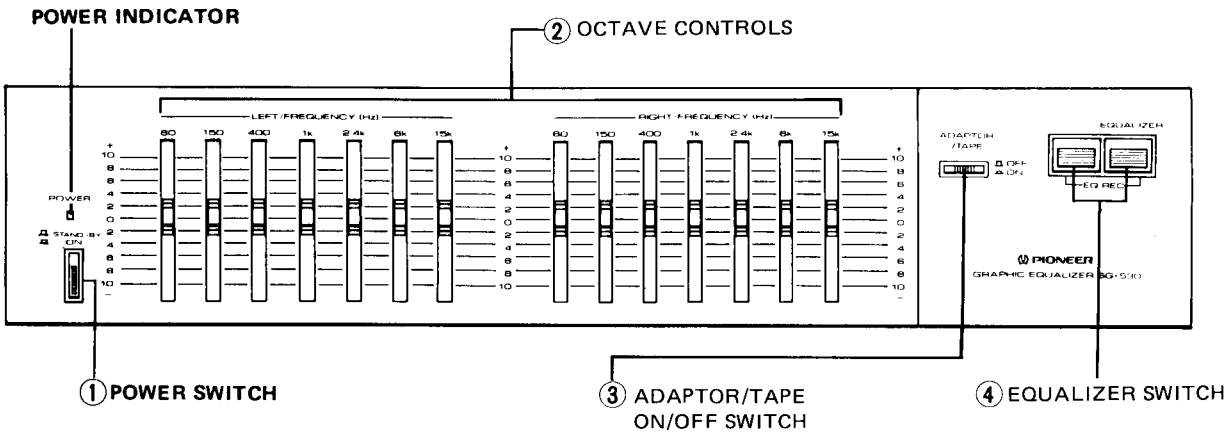
1. FRONT PANEL FACILITIES

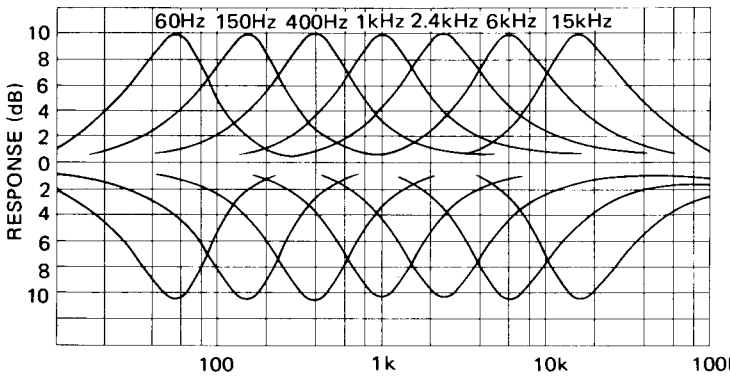


① POWER SWITCH

Depress this switch to turn power on to the SG-530. Because this switch is connected to the secondary winding of the power transformer, power is still supplied to the primary winding even when the power switch is returned to the STAND-BY (⏻) position. Always unplug the power cord from the wall socket when the SG-530 is not going to be used for a long time.

② OCTAVE CONTROLS

Move these controls above or below the center (zero) position to boost or attenuate the corresponding frequency bands by up to ±10dB as shown in the figure below. The seven frequency bands are centered at 60Hz, 150Hz, 400Hz, 1kHz, 2.4kHz, 6kHz and 15kHz.



Octave control variation curves

③ ADAPTOR/TAPE ON/OFF SWITCH

Depress this switch when listening to the tape deck connected to the rear panel TAPE terminals. In the ON position, only the signal from the TAPE PLAY terminals enters the equalizer. In the OFF position, only the signal from the EQUALIZER INPUT terminals enters the equalizer.

④ EQUALIZER SWITCH

- Press the right-hand EQUALIZER switch to compensate for the frequency response of the signals entering the EQUALIZER INPUT (REC) terminals. The compensated signals are then made available from the EQUALIZER OUTPUT (PLAY) terminals as the output signals.
- Press both switches when recording signals which have been compensated by the SG-530. The compensated signals are then made available from the EQUALIZER OUTPUT (PLAY) terminals and ADAPTOR/TAPE (REC) teminals.

The same source signals are output at the ADAPTOR/TAPE (REC) terminals as the signals entering the INPUT (REC) terminals. When the front panel's ADAPTOR/TAPE switch is pushed to the ON position, the signals entering the ADAPTOR/TAPE (PLAY) terminals are made available at the OUTPUT (PLAY) terminals. Use this when connecting a second tape deck or connecting an adaptor component such as a mic mixing amplifier. When a tape deck has been connected, the front panel's ADAPTOR/TAPE switch functions as a tape monitor switch.

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2. SPECIFICATIONS

Graphic Equalizer Section

Equalizer Range
(Individual channel adjust) . . . . . ±10dB
60Hz, 150Hz, 400Hz, 1kHz, 2.4kHz, 6kHz, 15kHz
Total Harmonic Distortion
(1kHz, All Control; Flat, Output: 1V) 0.005%
Gain (Control: Flat) 0dB
Max. Output Voltage
(1kHz, T.H.D.: 0.01%, R_L: 50kΩ) 6V
Frequency Response . . . . . 5Hz ~ 70kHz $^{+0}_{-1}$dB
Signal-to-Noise Ratio
(IHF A Network, short circuited, 1V Output) . . 100dB
Input Impedance . . . . . 50k ohms
Output Impedance . . . . . No more than 600 ohms

Miscellaneous

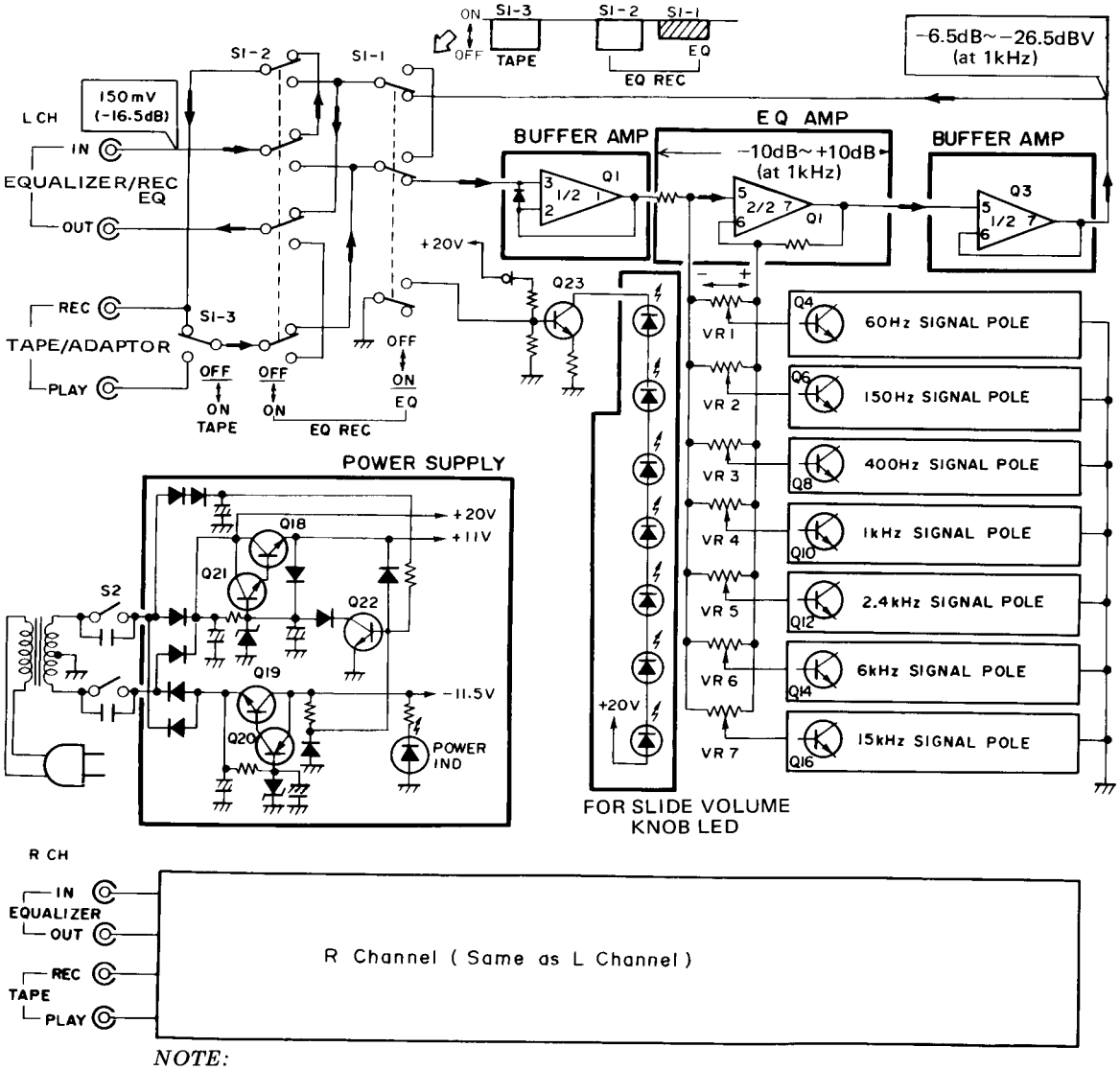
Power Requirements AC120V, 60Hz
Power Consumption 10W
Dimensions . . . . . 420(W) x 97(H) x 216(D) mm
16-9/16(W) x 3-13/16(H) x 8-1/2(D) in.
Weight (without package) . . . . . 2.8kg, 6 lb 3oz

Furnished Parts

Connection cord with pin plugs 2
Operating Instructions 1

NOTE:
Specifications and the design subject to possible modification without notice due to improvements.

3. BLOCK DIAGRAM



NOTE:
Push-button switches S1-1, S1-2 and S1-3 are locked independently.

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4. CIRCUIT DESCRIPTIONS

GRAPHIC EQUALIZER SECTION

A graphic equalizer is a device which divides the audio frequency band into several segments called octaves so that the level of each individual octave can be increased or reduced. The SG-530 divides reproduced frequencies into 7 octaves with center frequencies of 60 Hz, 150 Hz, 400 Hz, 1 kHz, 2.4 kHz, 6 kHz and 15 kHz. The level of each octave can be varied throughout a range of ±10 dB, and the left channel and the right channel can be adjusted independently.

Further, when the equalizer switch (EQ SW) is ON, the LEDs built into the level controls (sliding variable resistor knobs) light to allow the frequency response of each octave to be determined visually. The equalizer element is an LC series resonance circuit in which the active element is an inductor equivalent. This resonance circuit is connected to the variable resistor linking the positive and negative input terminals. (See Figure 4-1.)

This causes the impedance of the resonance circuit and the resistance of the variable resistor to act as constants for the input circuit and the feedback circuit. Further, buffer amplifiers are located before and after the EQ AMP so that the frequency response of the equalizer element are not affected by the impedance of audio equipment connected to the SG-530.

Figure 4-1 shows the equivalent circuit for the graphic equalizer section. In the area surrounded by the dotted line, the circuit on the Q1 side of point A is equivalent to an inductance and a resistance connected in series. Any required resonant frequency can be obtained by changing the inductance and capacitance of the series resonance circuit by varying C_1, C_2, R_3 and R_4. With the SG-530, 7 equalizer elements with different resonance frequencies are included in one EQ AMP, and each frequency segment can be adjusted independently. The frequency response of each octave is boosted when the slider of the variable resistor is moved toward the minus input side (the feedback input side) of EQ AMP IC1; conversely, it is reduced when the slider is moved to the plus side.

POWER SUPPLY CIRCUIT

As is shown in Figure 4-2, two voltage (+11 V and -11.5 V) are supplied by the regulated power supply of the graphic equalizer section. The LED set in the knob of each sliding resistor is supplied with stable current by Q23, so the light emitted by the LED is steady. Further, the load on Q18 and Q21 is light because the LED current is obtained after full wave rectification. Q23 goes ON when the EQ switch is turned ON to release GND on the base side, and the LED lights when Q23 goes ON.

SWITCH SECTION

- **TAPE switch (S1-3)**

This switch selects between a program source or a tape playback (or REC monitor) signal.

- **EQ REC switch (S1-1 and S1-2)**

Turning this switch on causes an equalized program source signal to be output to the REC terminals.

- **EQ switch (S1-1)**

This switch determines whether or not a signal is to be equalized; when this switch is OFF, the equalizing circuit is by-passed and the input signal is connected directly to the output terminals.

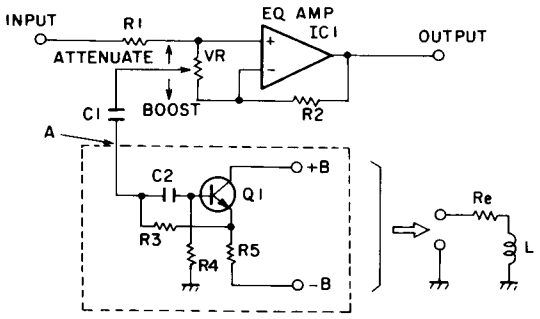

Fig. 4-1 Graphic equalizer

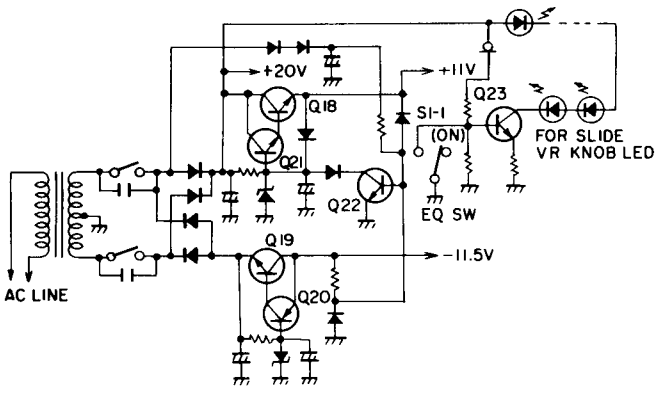

Fig. 4-2 Power supply circuit

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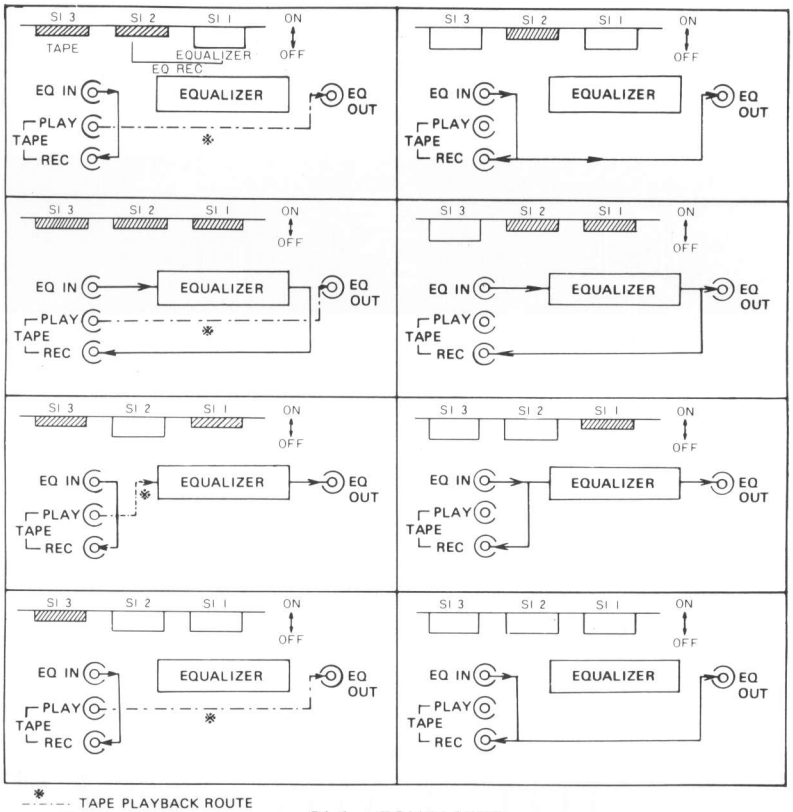


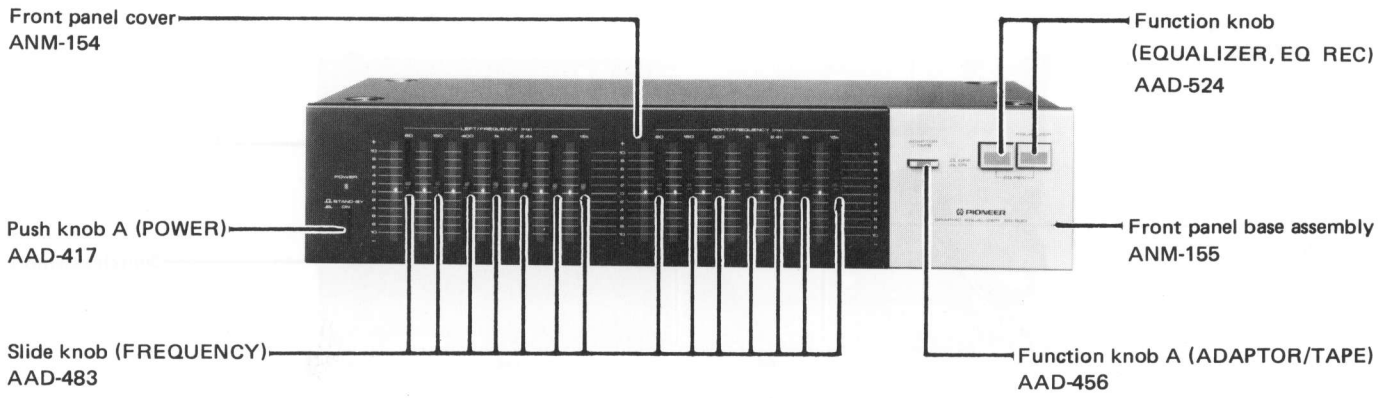
S1-1 : EQUALIZER ┐ EQ REC
S1-2 : ┘
S1-3 : TAPE

5. PARTS LOCATION

NOTES:

- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★ .*
  ★★ GENERALLY MOVES FASTER THAN ★
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

Front Panel View



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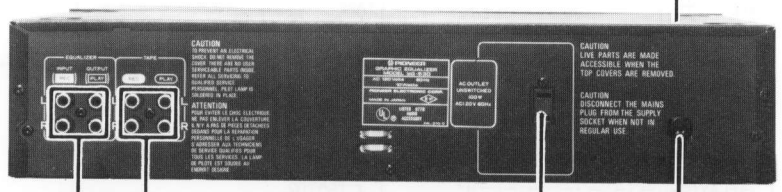
Rear Panel View



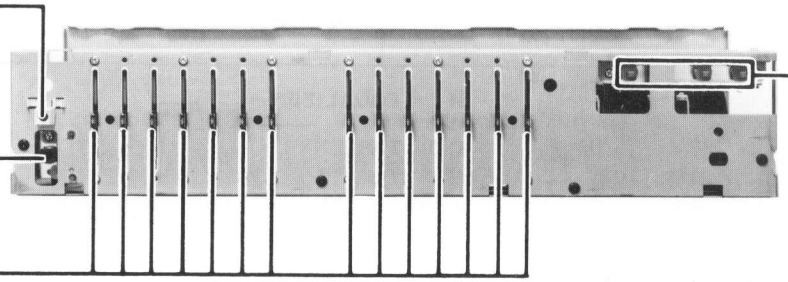
Bonnet case
ANE-385

⚠ AC power cord
ADG-052

⚠ AC socket
AKP-038

Terminal (EQUALIZER, TAPE)
AKB-078

Front View with Panel Removed



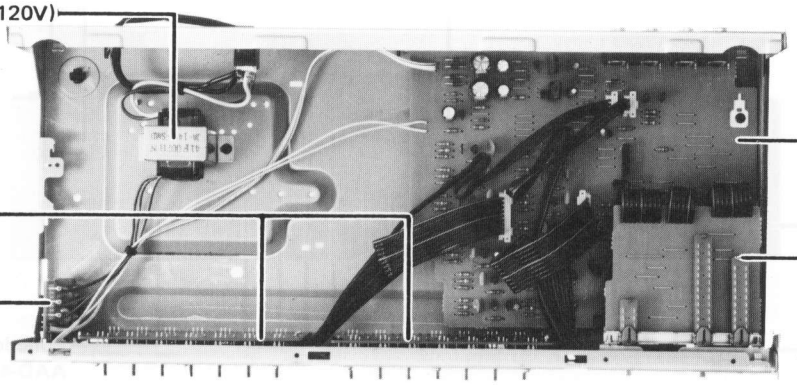
★ LED (D13, POWER)
AEL-382

★★ Push switch
(S2, POWER)
ASG-215

★ Slide resistor
(VR1–VR7, with LED)
ACX-012

★★ Push switch
(S1, EQUALIZER/EQ
REC/TAPE)
ASG-335

Top View with Bonnet Case Removed



⚠ ★ Power transformer (T1, 120V)
AAT-806

AF assembly
GWM-244

VR assembly
AWX-243

Switch assembly

Power switch assembly

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6. PARTS LIST

NOTES:

- *When ordering resistors, first convert resistance values into code form as shown in the following examples.*
  Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J=5%, and K=10%).

560Ω	*56 × 10¹*	*561 .....*	*RD¼PS 5 6 1 J*
47kΩ	*47 × 10³*	*473 .....*	*RD¼PS 4 7 3 J*
0.5Ω	*0R5 .....*		*RN2H 0 R 5 K*
1Ω	*010 .....*		*RS1P 0 1 0 K*

  Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62kΩ	*562 × 10¹*	*5621 ....*	*RN¼SR 5 6 2 1 F*

- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★ .*
  ★★ GENERALLY MOVES FASTER THAN ★
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

Miscellaneous Parts

P.C. BOARD ASSEMBLIES

Mark	Part No.	Symbol & Description
	GWM-244	AF Assembly
	AWX-243	VR Assembly

OTHERS

Mark	Part No.	Symbol & Description	
⚠ ★	ATT-806	T1	Power transformer (120V)
⚠	AKP-038		AC socket (AC OUTLETS)
⚠	ADG-052		AC power cord

AF Assembly (GWM-244)

CAPACITORS

Mark	Part No.	Symbol & Description
	CEA 100M 50L	C1, C2, C5, C6
	CEA R33M 50L	C15, C16
	CEA R68M 50L	C17, C18
	CEA 1R5M 50L	C19, C20
	CEA 101M 25L	C37–C39
	CEA 220M 25L	C40, C41
	CEA 471M 25L	C35, C36
	CQMLA 124K 50	C13, C14, C33, C34
	CQMA 153K 50	C29, C30
	CQMA 223K 50	C9, C10
	CQMA 393K 50	C31, C32
	CQMA 563K 50	C11, C12
	CKDYB 102K 50	C23, C24
	CKDYB 222K 50	C25, C26
	CKDYB 391K 50	C21, C22
	CKDYB 562K 50	C27, C28
	CKDYB 822K 50	C7, C8
	CCDSL 221J 50	C3, C4

RESISTORS

NOTE: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Part No.	Symbol & Description
	RD¼PM □□□J	R1–R79

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	M5218L (NJM4558DX)	Q1–Q3
★★	2SC1815 (2SC1919)	Q4–Q17
★★	2SD313 (2SD880)	Q18, Q19
★★	JA101 (2SA1115/A/)	Q20
★★	JC501 (2SC2603/A/)	Q21–Q24
★	10E2 (SIB01-02)	D1–D4
★	KZL120	D5, D6
★	US1035 (1S1555)	D7–D12, D15, D16
★	10YD13BFD	D14

OTHERS

Mark	Part No.	Symbol & Description
	AKB-078	Terminal 4P (TAPE, EQUALIZER)

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Switch Assembly

Mark	Part No.	Symbol & Description	
★★	ASG-335	S1	Push switch (EQUALIZER/ EQ REC/TAPE)

Power Switch Assembly

Mark	Part No.	Symbol & Description	
★★	ASG-215	S2	Push switch (POWER)
	ACG-019	C42, C43	(0.01/AC150V)

LED Assembly

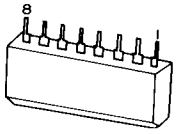
Mark	Part No.	Symbol & Description	
★	AEL-382	D13	LED (POWER)

VR Assembly (AWX-243)

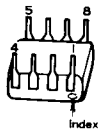
Mark	Part No.	Symbol & Description	
★	ACX-012	VR1–VR7	Slide resistor (with LED) (20k-B3)

External Apearance of Transistors and ICs

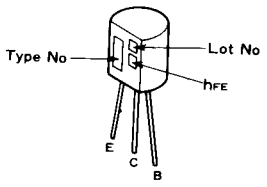
M5218L



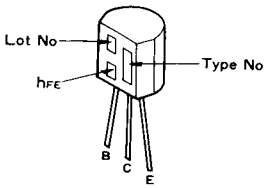
NJM4558DX



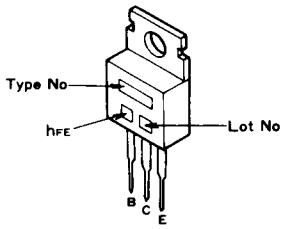
2SC1815



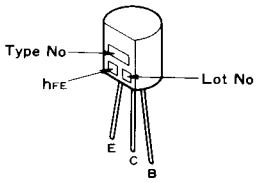
2SC1919



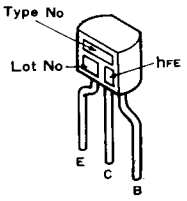
2SD313
2SD880



JA101
JC501



2SC2603/A/
2SA1115/A/



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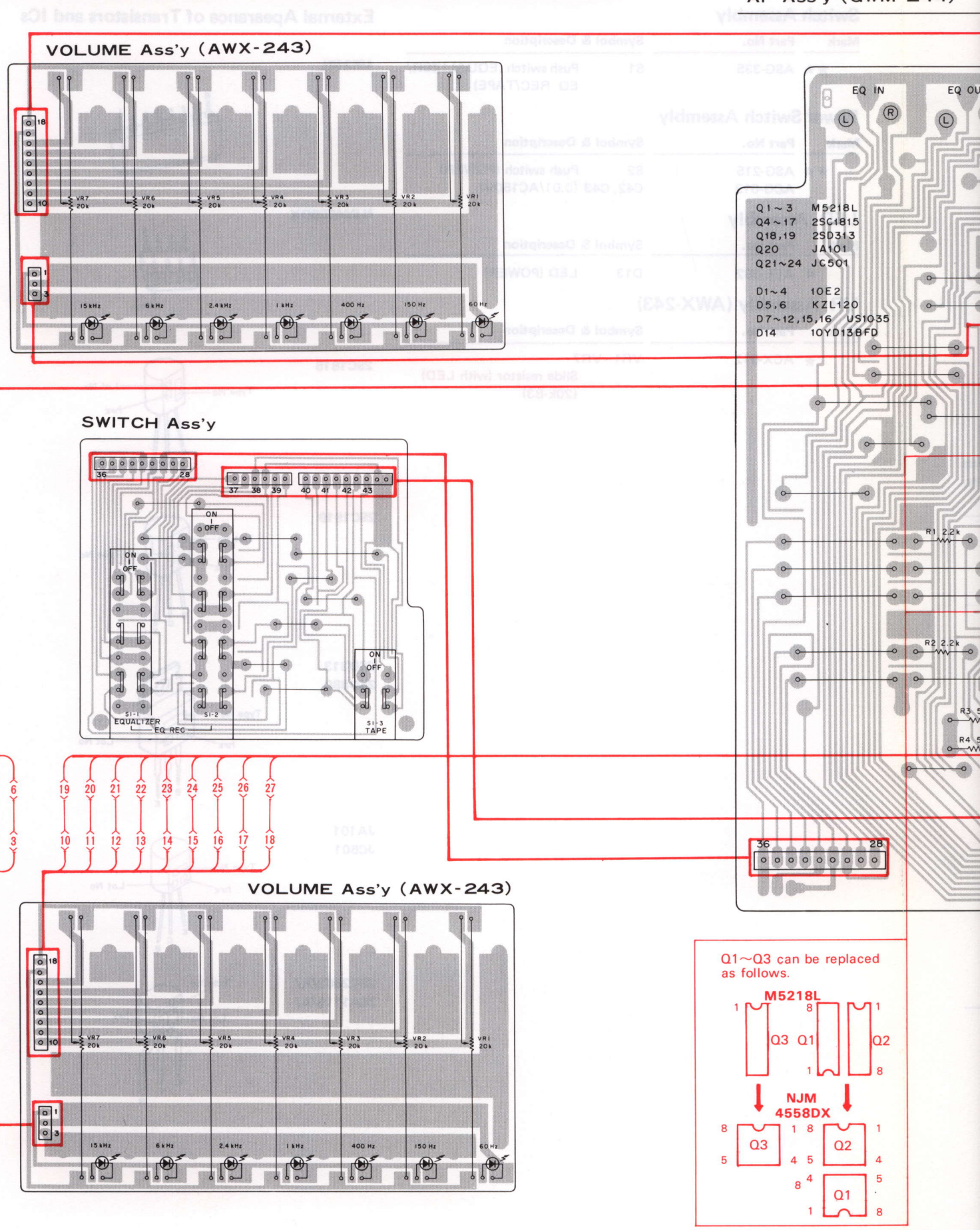
7. P.C.BOARDS CONNECTION DIAGRAM



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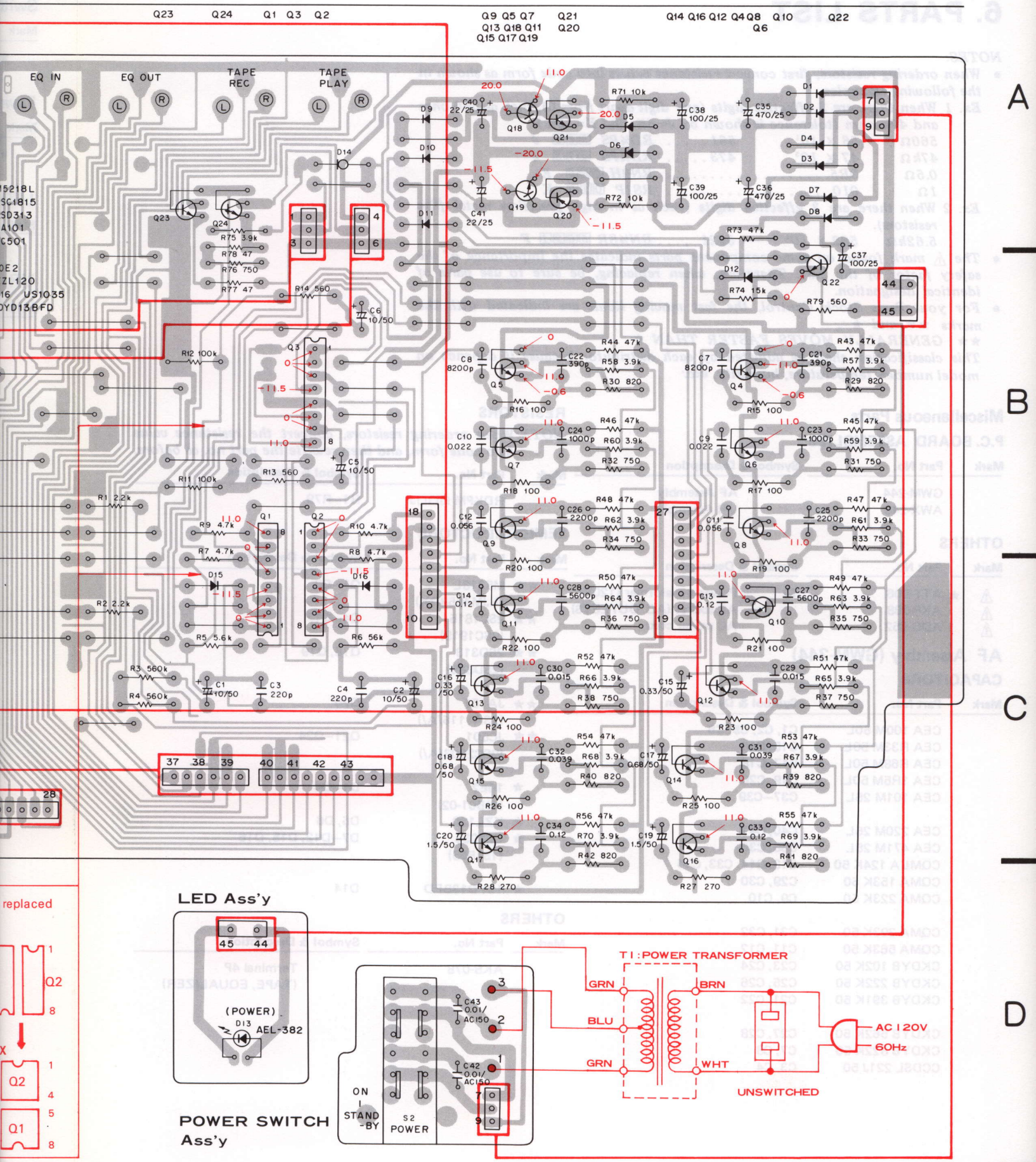

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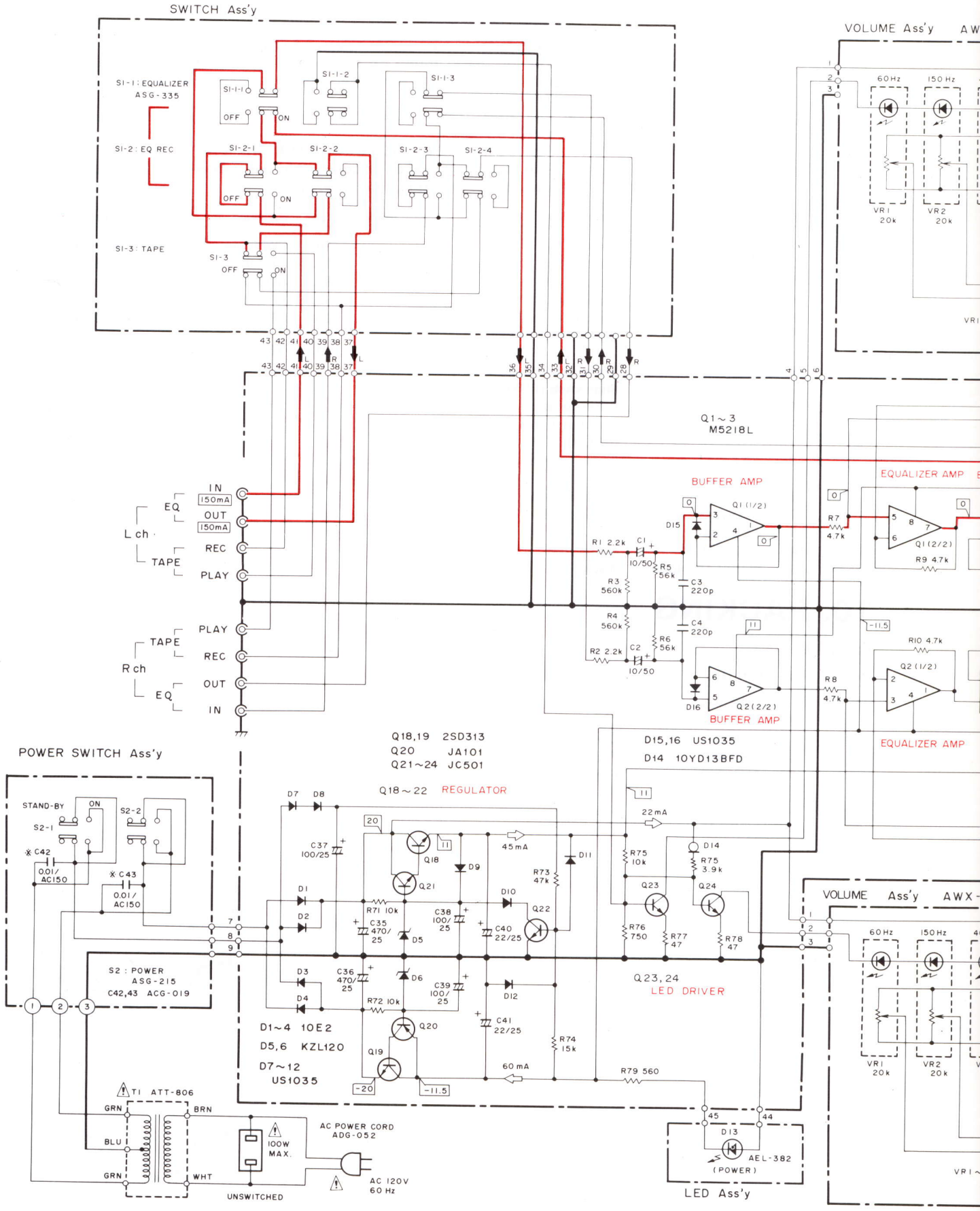
8. SCHEMATIC DIAGRAM



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NOTE:
The indicated semiconductors are representative ones only. Other alternative semiconductors may be used and are listed in the parts list.

1. RESISTORS:
Indicated in Ω, ¼W, ±5% tolerance unless otherwise noted k : kΩ, M : MΩ, (F) : ±1%, (G) : ±2%, (K) : ±10%,(M) : ± 20% tolerance

2. CAPACITORS:
Indicated in capacity (μF)/voltage (V) unless otherwise noted p : pF
Indication without voltage is 50V except electrolytic capacitor.

3. VOLTAGE, CURRENT:
V : Signal voltage at 150 mV output (1kHz)
: DC voltage (V) at no input signal
mA : DC current at no input signal

4. OTHERS:
: Signal route.
The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.

This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

VOLUME Ass'y AWX-243

60Hz 150Hz 400Hz 1kHz 2.4kHz 6kHz 15kHz

VR1 20k VR2 20k VR3 20k VR4 20k VR5 20k VR6 20k VR7 20k

VR1~7 : FREQUENCY ACX-012

AF Ass'y GWM-244

EQUALIZER AMP BUFFER AMP

Q1(2/2) Q3(1/2) Q2(1/2) Q3(2/2)

Q4~17 2SC1815

EQUALIZER AMP

SWITCHES:

S1-1	EQUALIZER	ON – OFF
S1-1,2	EQ REC	ON – OFF
S1-3	TAPE	ON – OFF
S2	POWER	ON – STAND-BY

The underlined indicates the switch position.

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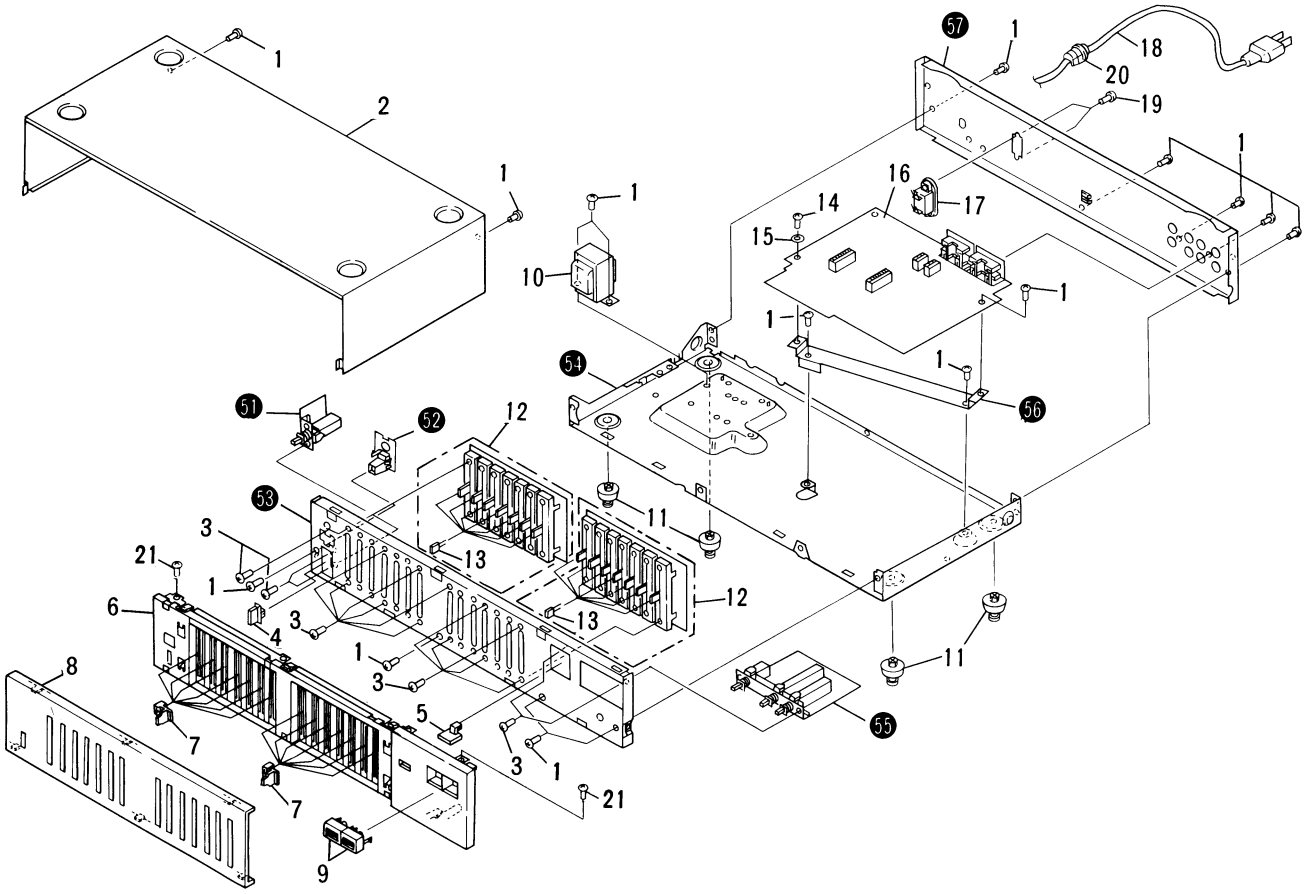
9. EXPLODED VIEW

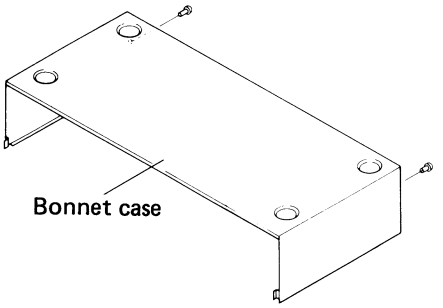


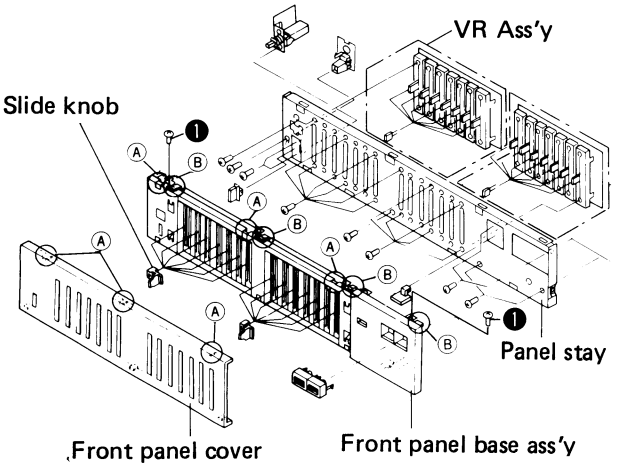
REMOVAL OF THE FRONT PANEL BASE ASS'Y (See the Disassembly Diagram)

1. Remove the bonnet case.
2. Remove the front panel cover.
   Release the front panel cover lock by inserting a small screwdriver between point Ⓐ of the front panel cover and point Ⓐ of the front panel base ass'y. Then, remove the front panel cover and remove the slide knob.
3. Remove the front panel base ass'y.
   Remove the two screws ❶ and release the panel stay lock by pushing against the hook at point Ⓑ of the front panel base ass'y with the small screwdriver, and remove the ass'y by pulling forward.

Assembly

4. Position the front panel base ass'y on the panel stay.
5. Attach the slide knob to the VR ass'y control.
6. Attach the front panel cover.
7. Attach the bonnet case.





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Parts List

NOTES:

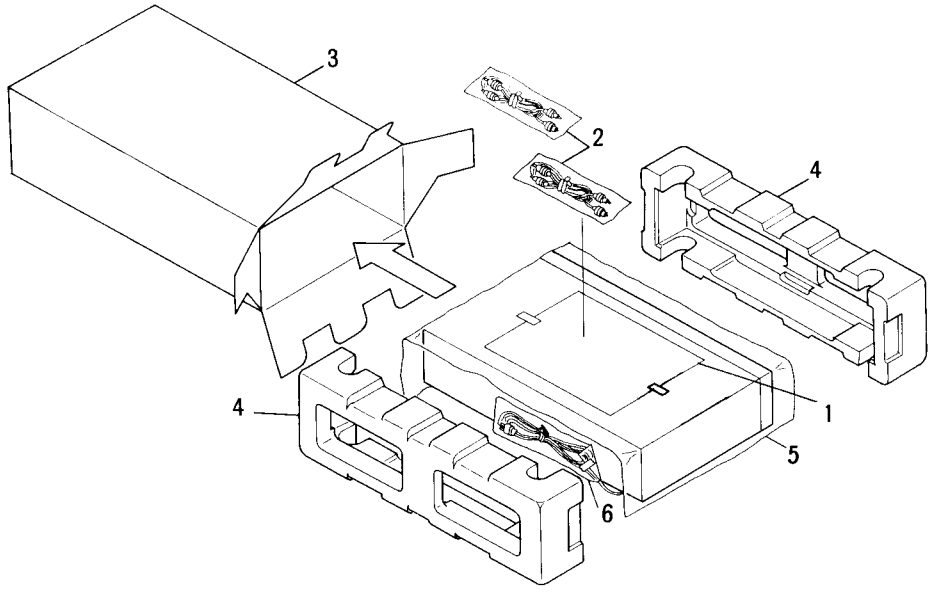
- *Parts without part number cannot be supplied.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★ *GENERALLY MOVES FASTER THAN* ★
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

Mark	No.	Part No.	Description
	1.	BBZ30P080FZK	Screw 3 X 8
	2.	ANE-385	Bonnet case
	3.	PMZ30P060FZB	Screw 3 X 6
	4.	AAD-417	Push knob A (POWER)
	5.	AAD-456	Function knob A (ADAPTOR/TAPE)
	6.	ANM-155	Front panel base assembly
	7.	AAD-483	Slide knob (FREQUENCY)
	8.	ANM-154	Front panel cover
	9.	AAD-524	Function knob (EQUALIZER, EQ)
⚠	★ 10.	ATT-806	Power transformer (120V)
	11.	AEC-903	Foot assembly
	12	AWX-243	VR assembly
	★ 13.	AEL-394	LED
	14.	AEC-558	Nylon rivet
	15.	WA35F100N080	Washer
	16.	GWM-244	AF assembly
⚠	17.	AKP-038	AC socket (AC OUTLETS)
⚠	18.	ADG-052	AC power cord
	19.	MTZ30P100FZK	Screw 3 X 10
	20.	AEC-327	Strain relief
	21.	VBZ30P060FMC	Screw 3 X 6
	51.		Power switch assembly
	52.		LED assembly
	53.		Panel stay
	54.		Chassis
	55.		Switch assembly
	56.		P.C.B holder
	57.		Rear panel

10. PACKING

Parts List

Mark	No.	Part No.	Description
	1.	ARB-496	Operating instructions (English)
	2.	ADE-005	Connection cord
		ADE-055	Connection cord (Black)
	3.	AHE-033	Packing case
	4.	AHA-308	Front rear pad
	5.	AHG-140	Sheet
	6.	AHG-023	Vinyl bag



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11. FOR R,R/G,WE,WB AND WP TYPES

Model SG-530 R, R/G, WE, WB and WP types are the same as the SG-530 KU with the exception of following sections.

11.1 CONTRAST OF MISCELLANEOUS PARTS

NOTES:

- *Parts without part number cannot be supplied.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★ .*
  ★★ GENERALLY MOVES FASTER THAN ★
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

Mark	Symbol & Description	Part No.					
		KU type	R type	R/G type	WE type	WB type	WP type
	Fuse Assembly (P.C. board)	.....	.....	.....	Non supply	.....	Non supply
⚠ ★★	T1 Power transformer (120V)	ATT-806	.....	.....	.....	.....	.....
⚠ ★★	T1 Power transformer (110V–120V, 220V–240V)	.....	ATT-807	ATT-807	.....	.....	.....
	T1 Power transformer (220V–240V)	.....	.....	.....	ATT-808	ATT-808	ATT-808
⚠ ★★	S3 Voltage selector switch	.....	AKX-501	AKX-501	.....	.....	.....
⚠	AC socket (AC OUTLETS)	AKP-038	AKP-038	AKP-038	AKP-026	AKP-044	.....
⚠	AC power cord	ADG-052	ADG-072	ADG-072	ADG-071	ADG-063	ADG-064
	Strain relief	AEC-327	.....	.....	.....	.....	.....
⚠ ★★	FU1 Fuse (2A)	.....	.....	.....	AEK-017	.....	.....
	Packing case	AHE-033	AHE-060	AHE-060	AHE-060	AHE-060	AHE-060
	Operating instructions (English)	ARB-496	ARB-503	ARB-503	.....	ARB-503	ARB-503
	Operating instructions (Spanish)	.....	ARC-022	.....	.....	.....	.....
	Operating instructions (English/German/French/Italian)	.....	.....	.....	ARE-045	.....	.....

11.2 SPECIFICATIONS

The specifications for SG-530/R, R/G, WE, WB and WP types are the same as the SG-530/KU type except for following sections.

Miscellaneous

Power Requirements
WE, WB, WP types ..... AC220 — 240V 50/60Hz
R, R/G types ... AC110V — 120V, 220V — 240V
50/60Hz

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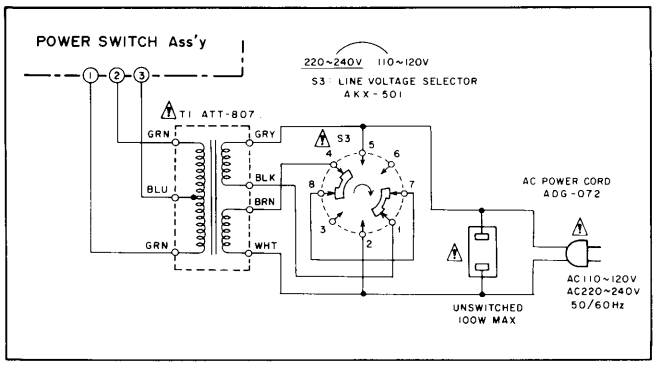
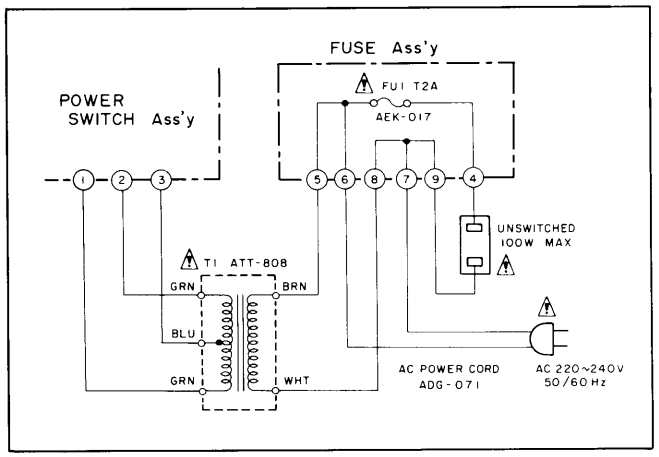
11.3 SCHEMATIC DIAGRAMS AND P.C. BOARD

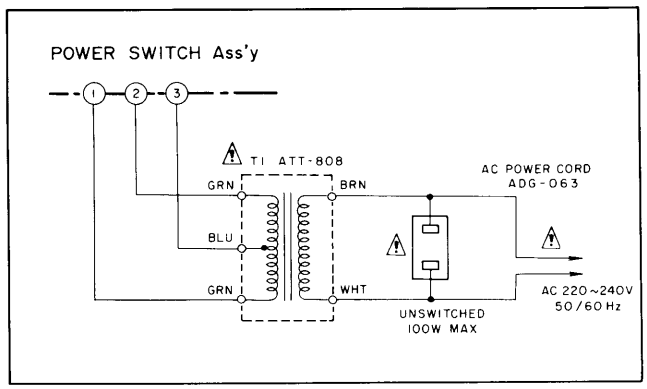
POWER SUPPLY CIRCUIT FOR R, R/G TYPES



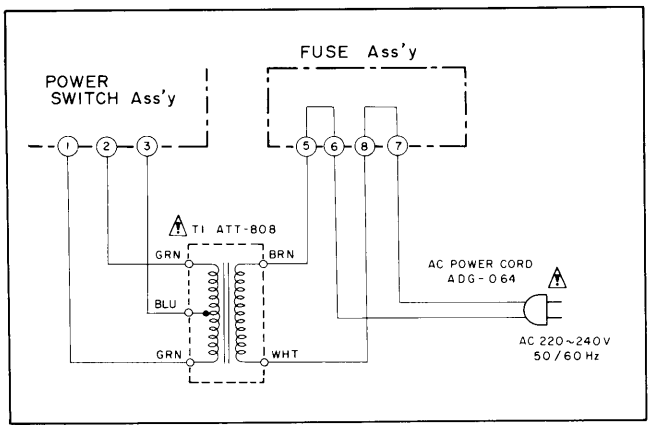
POWER SUPPLY CIRCUIT FOR WE TYPE



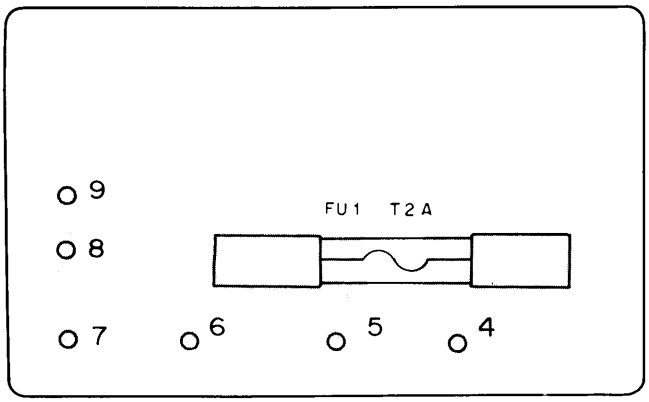
POWER SUPPLY CIRCUIT FOR WB TYPE



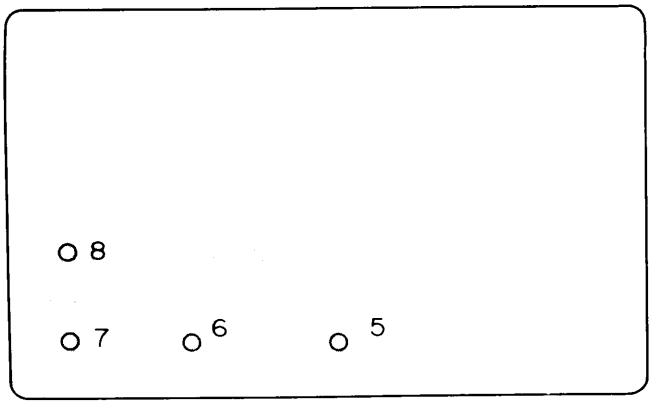
POWER SUPPLY CIRCUIT FOR WP TYPE



Fuse Assembly (WE type)



Fuse Assembly (WP type)



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